

CLAIMS

What is claimed is:

1. A mass transported alignment mark system, comprising:

5 a substrate that has been subjected to a mass transport process; and
 a lens alignment structure formed on the substrate that yields a light pattern when
 the substrate or a plane near the substrate is imaged.

2. An alignment mark system as claimed in claim 1, wherein the substrate is gallium phosphide.

10 3. An alignment mark system as claimed in claim 1, wherein the substrate is silicon.

4. An alignment mark system as claimed in claim 1, further comprising a metal layer that is aligned to the light pattern from the lens structure.

5. An alignment mark system as claimed in claim 4, wherein the metal layer is used in a metal bonding process.

15 6. An alignment mark system as claimed in claim 5, wherein the metal layer comprises alignment marks that are used the metal bonding process.

7. An alignment mark system as claimed in claim 4, wherein the metal layer is used in a solder bonding process.

20 8. An alignment mark system as claimed in claim 7, wherein the metal layer comprises alignment marks that are aligned to the light pattern.

9. An alignment mark system as claimed in claim 1, wherein the lens alignment structure comprises a concave lens.

10. An alignment mark system as claimed in claim 1, wherein the lens alignment structure comprises a cylindrical lens.

11. An alignment mark system as claimed in claim 1, wherein the lens alignment structure comprises a concave cylindrical lens.

5 12. An alignment mark system as claimed in claim 1, wherein the lens alignment structure comprises multiple concave cylindrical lenses.

13. An alignment mark system as claimed in claim 1, wherein the lens alignment structure comprises multiple concave cylindrical lenses, as least two of the cylindrical lenses being arranged orthogonally with respect to each other.

10 14. An alignment mark system, comprising:
a substrate; and
a lens alignment structure formed in the substrate that has a focal point in the substrate or near a surface of the substrate.

15 15. An alignment mark system as claimed in claim 14, wherein the substrate is gallium phosphide.

16. An alignment mark system as claimed in claim 14, wherein the substrate is silicon.

17. An alignment mark system as claimed in claim 14, further comprising a metal layer that is aligned to the light pattern from the lens structure.

20 18. An alignment mark system as claimed in claim 17, wherein the metal layer is used in a metal bonding process.

19. An alignment mark system as claimed in claim 18, wherein the metal layer comprises alignment marks that are aligned to the an alignment feature generated by the lens alignment structure.

20. An alignment mark system as claimed in claim 17, wherein the metal layer is used in a solder bonding process.

21. An alignment mark system as claimed in claim 20, wherein the metal layer comprises alignment marks that are aligned to the an alignment feature generated by the lens alignment structure.

22. An alignment mark system as claimed in claim 14, wherein the lens alignment structure comprises a concave lens.

23. An alignment mark system as claimed in claim 14, wherein the lens alignment structure comprises a cylindrical lens.

24. An alignment mark system as claimed in claim 14, wherein the lens alignment structure comprises a concave cylindrical lens.

25. An alignment mark system as claimed in claim 14, wherein the lens alignment structure comprises multiple concave cylindrical lenses.

26. An alignment mark system as claimed in claim 14, wherein the lens alignment structure comprises multiple concave cylindrical lenses, as least two of the cylindrical lenses being arranged orthogonally with respect to each other.